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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,680	11/20/2003	Lewis R. Norman	2003-IP-009800U1	8569

7590 12/15/2006  
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EXAMINER

WHITE, EVERETT NMN

ART UNIT PAPER NUMBER

1623

DATE MAILED: 12/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/717,680

Applicant(s)

NORMAN ET AL.

Examiner

Everett White

Art Unit

1623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 and 32-34 is/are pending in the application.
- 4a) Of the above claim(s) 8-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 32 is/are rejected.
- 7) ☒ Claim(s) 33 and 34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. The Pre-Brief Appeal Conference Request filed August 25, 2006 resulted in prosecution of the instant application being reopened. The amendment filed March 8, 2006 affects the instant application accordingly:

- (A) Claims 8-31 have been canceled;
- (B) New Claims 33 and 34 have been added;
- (C) Claims 2-4 have been amended;
- (D) Comments regarding the Office Action in the Pre-Brief Appeal Conference have been provided drawn to:
  - (I) 102(b) rejection, which has been withdrawn for Claims 1-4, 6, 7 and 34; maintained in regard to Claim 32 for the reasons of record;
  - (II) 103(a) rejection, rendered moot by new ground of rejection.

2. Claims 1-7 and 32-34 are pending in the case.

3. The text of those sections of Title 35, U. S. Code not included in this action can be found in a prior Office action.

### ***Claim Rejections - 35 USC § 102***

4. Claim 32 is rejected under 35 U.S.C. 102(b) as being anticipated by Phillips et al (US Patent No. 5,002,125).

Applicants claimed a metal ion crosslinked polysaccharide in the form of a product-by-process claim. The Office considers product-by-process claims as product claims. Applicants are reminded that process limitations cannot impart patentability to a product that is not patentably distinguished over the prior art. *In re Thorpe et al.* (CAFC 1985), supra; *In re Dike* (CCPA 1968) 394 F2d 584, 157 USPQ 581; *Tri-Wall Containers, Inc. v. United States et al.* (Ct Cls 1969) 408 F2d 748, 161 USPQ 116; *In re Brown et al.* (CCPA 1972) 450 F2d 531, 173 USPQ 685; *Ex parte Edwards et al.* (BPAI 1986) 231 USPQ 981. Accordingly, the process limitations disclosed in Claim 32 has not been considered.

The Phillips et al patent discloses titanium acetylacetonate as a crosslinking agent for hydroxypropyl guar (HPG) or carboxymethyl hydroxyethylcellulose (CMHEC)

Art Unit: 1623

(see column 10, lines 28-30), which anticipate the instantly claimed metal ion crosslinked polysaccharide of instant Claim 32.

***Claim Rejections - 35 USC § 103***

5. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Phillips et al (US Patent No. 5,002,125).

Applicants claim a method of crosslinking a polysaccharide comprising the steps of: (a) providing a metal coordinating group having a reactive site, (b) derivatizing a polysaccharide with the metal coordinating group to produce a derivatized polysaccharide having bidentate ligands, and (c) crosslinking the derivatized polysaccharide having bidentate ligands with a metal ion to form a metal ligand coordination complex. Additional limitations in the dependent claims include the method wherein the polysaccharide comprises specific types of polysaccharides; the method wherein the derivatized polysaccharide having bidentate ligands is crosslinked with a crosslinking agent comprising a compound chosen from the group consisting of copper, nickel, iron, ruthenium, palladium, platinum, iridium and cobalt; the method wherein the bidentate ligands comprise ethylenediamine, acetylacetonate ions, dithiocarbamate, 2,2'-bipyridine, 1,10-phenanthroline, or 8-hydroxyquinolino; the presence of a specific amount of crosslinking agent in the method; the method wherein step (c) occurs within a wellbore in a subterranean formation; the method wherein the polysaccharide comprises guar and the crosslinking agent is a derivative of iron or ruthenium.

The Phillips et al patent discloses polymers useful in the formation of stable fracturing fluid, which include polysaccharides and polysaccharide derivatives, wherein guar, hydroxypropyl guar, hydroxyethyl guar, cellulose and its derivatives, and xanthan are set forth as examples (see column 9, last paragraph and column 10, lines 1 and 2). The Phillips et al patent discloses cross-linking agents in combination with solutions of polymeric thickening agents, which include multivalent metal ions, wherein iron is listed as an example of a multivalent metal ion that may be used in the combination. Phillips et al discloses that the combination of cross-linking agents and polymers include admixing guar and its derivatives as a polymer with a cross-linking agent, wherein

Art Unit: 1623

compounds suitable for use as crosslinking agents include acetylacetonate ions -in the form of titanium acetylacetonate (see column 10, 2<sup>nd</sup> full paragraph). The Phillips et al patent discloses that titanium acetylacetonate is an effective agent for hydroxypropyl guar or carboxymethyl hydroxypropyl cellulose (see column 10, lines 28-30). The guar, hydroxypropyl guar and hydroxyethyl guar of the Phillips et al patent anticipate the guar, hydroxy ethyl and hydroxyl propyl derivatives of gums in instant Claim 2. The iron disclosed in column 10, line 14 of the Phillips et al patent embraces the iron disclosed in instant Claims 3 and 7, and the titanium acetylacetonate disclosed in the Phillips et al patent at line 26 of column 10 embraces the acetylacetonate ions disclosed in instant Claim 4. Also, see column 3, lines 61-64 of the Phillips et al patent wherein it is disclosed that the fracturing fluid thereof is introduced into a well and displaced from the wellhead down the well to the vicinity of the subterranean formation, which embraces the subject matter of instant Claim 6.

The instantly claimed method of crosslinking a polysaccharide differs from the information disclosed in the Phillips et al by claiming a step that involve derivatizing a polysaccharide with the metal coordinating group to produce a derivitized polysaccharide having bidentate ligands.

Although the Phillips et al patent does not point out a derivitized polysaccharide having bidentate ligands, Phillips et al does disclosed in column 10, lines 28 and 29, "titanium acetylacetonate as being an effective cross-linking agent for hydroxypropyl guar", which suggests the formation of a derivitized polysaccharide having bidentate ligands as disclosed in the instant claims. See instant Claim 4 wherein the bidentate ligands thereof may be selected as "acetylacetonate ions".

One having ordinary skill in the art would have been motivated to employ the process of the prior art with the expectation of obtaining the desired product because the skilled artisan would have expected the analogous starting materials to react similarly.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of Applicants invention having the Phillips et al patent before him to use the method thereof to cross-linked a polysaccharide in view of the closely related structures

Art Unit: 1623

of the starting materials (polysaccharides, coordinating groups and cross-linking agents) used to carry out the method thereof and the resulting expectation of the cross-linked polysaccharides having similar polymeric thickening properties.

***Allowable Subject Matter***

6. Claims 33 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Reasons for Indicating Allowable Subject Matter***

7. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose a method of crosslinking a polysaccharide comprising crosslinking a derivatized polysaccharide having bidentate ligands with a metal ion to form a metal ligand coordination complex, wherein the bidentate ligand is 2,2'-bipyridine.

***Summary***

8. Claims 1-7 and 32 are rejected; Claims 33 and 34 are objected to.

***Examiner's Telephone Number, Fax Number, and Other Information***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Everett White whose telephone number is 571-272-0660. The examiner can normally be reached on 9:30 to 6:00.

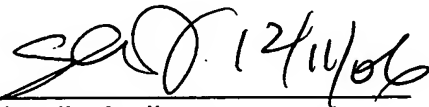
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shaojia A. Jiang can be reached on 571-272-0627. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1623

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



E. White



Shaojia A. Jiang  
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